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(54) Title: PRODUCTION OF LINEAR ALKYL BENZENE

(57) Abstract: This invention relates to a process for producing linear alkyl benzene, the process including the steps of obtaining a hydrocarbon condensate containing olefins, paraffins and oxygenates from a low temperature Fischer-Tropsch reaction; a) fractionating a desired carbon number distribution from the hydrocarbon condensate to form a fractionated hydrocarbon condensate stream; b) extracting oxygenates from the fractionated hydrocarbon condensate stream from step (a) to form a stream containing olefins and paraffins; c) combining the stream containing olefins and paraffins from step (b) with the feed stream from step (g) to form a combined stream; d) alkylating olefins in the combined stream from step (c) with benzene in the presence of a suitable alkylation catalyst in an alkylation reactor; e) recovering linear alkyl benzene from the alkylation reactor; f) recovering unreacted paraffins from the alkylation reactor; g) dehydrogenating the unreacted paraffins in the presence of a suitable dehydrogenation catalyst to form a feed stream containing olefins and paraffins; and h) sending the feed stream containing olefins and paraffins from step (g) to step (c).

# INTERNATIONAL SEARCH REPORT

IB2004/000653

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 C07C7/10 C10G21/16 C07C2/70 C10G65/04 C10G65/12

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 C07C C10G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, CHEM ABS Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 392 109 B1 (O'REAR DENNIS J ET AL) 21 May 2002 (2002-05-21) the whole document -----	1-31
Y	WO 02/31085 A (SASOL TECHNOLOGY PTY LTD ; SCHOLTZ JACOB JOHANNES (ZA); WET JOHAN PETE) 18 April 2002 (2002-04-18) page 3, paragraph 3 - page 4, paragraph 4 claims 1-16 -----	1-26
Y	DE 199 11 910 A (LINDE AG) 21 September 2000 (2000-09-21) column 1, line 1 - line 23 column 1, line 48 - line 59 column 3, line 8 - line 29 claim 1 ----- -/-	1-26

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 686 317 A (QUANN RICHARD J ET AL) 11 August 1987 (1987-08-11) column 1, line 10 – line 17 table 2 -----	1-14, 22-26
X	US 2002/115732 A1 (JONES CLIVE ET AL) 22 August 2002 (2002-08-22) paragraphs '0030! – '0038! -----	32-45
A	WO 00/14184 A (EXXON RESEARCH ENGINEERING CO) 16 March 2000 (2000-03-16) the whole document -----	32-45
A	US 6 375 830 B1 (CLARK JANET R ET AL) 23 April 2002 (2002-04-23) the whole document -----	32-45

# INTERNATIONAL SEARCH REPORT

International application No.  
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## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3.  Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

**1. claims: 1-31**

A process for producing linear alkyl benzene, the fractionated hydrocarbon condensate product resulting therefrom and the linear alkyl benzene product formed therefrom.

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**2. claims: 32-45**

A process for producing three hydrocarbon fractions from a hydrocarbon condensate and a wax fraction product stream from a Fischer-Tropsch reaction

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## Information on patent family members

International Application No  
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Patent document cited in search report		Publication date		Patent family member(s)		Publication date
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